optoelectronic die and said at least one heatsink carrier; said at least one heatsink carrier being operatively connected to said optoelectronic die; said cavity of said overmold frame enclosing and securing said at least one heatsink carrier, said optoelectronic die and said flexible circuit.

A1 Cont.

-- 32. (Added) The coupling device in accordance with claim 31, further comprising: at least one Faraday barrier shield, said overmold frame housing said at least one Faraday barrier shield providing RF isolation of said at least one optoelectronic die. --

R E M A R K S

Reconsideration of the above-identified patent application is respectfully requested in view of the foregoing amendments and following remarks. New claims 31 and 32 have been added. Claims 15-26 were withdrawn from consideration. Claims 1 through 14, and 27 through 32 remain in this application.

An affidavit swearing back of the ICHINO et al. reference is being submitted under separate cover.

In accordance with the present invention, there is provided a single package for coupling a multiple channel fiber optic cable to a multiple channel Vertical Cavity Surface Emitting Laser (VCSEL) transmitter and for coupling a second multiple channel fiber optic cable to a multiple channel Perpendicularly Aligned Integrated Die (PAID) receiver. The active surface of both the receiving and transmitting (optoelectronic) dies are oriented perpendicular to the plane of the laminate package. The package can be soldered directly to an end user card and have its cable plugged directly through the tailstock. In other words, the cable can exit from the card in a direction parallel to the plane of the card.

The package article comprises a laminate table or board upon which amplifier dies are supported. The laminate carries an overmold frame that houses, optionally, a faraday barrier shield for RF isolation purposes. The overmold frame supports an optical subassembly, which accepts an optical connector that is attached to an end of the parallel fiber optic cable.

A retainer substantially encloses an optical coupler. Attached to the optical coupler is a heatsink carrier, which in turn supports an optoelectronic die. One function of the heatsink carrier is to remove heat from the optoelectronic die. The heat drawn into the heatsink carrier may be dissipated into the nearby air. Optionally, the heat may pass through a heat-conducting compound to a package cover where it is then dissipated to the air.

The rejections of claims 1 through 10, 12 through 17, 19 through 24 [sic -- claims 15-26 were previously withdrawn], and 27 through 30, based upon 35 U.S.C. §103 as unpatentable over ICHINO et al., and claims 11 and 18 [sic] as unpatentable over ICHINO et al. in further view of HENNINGSSON et al., are respectfully traversed for the following reasons:

a) Applicants conceived their invention prior to the ICHINO et al. filing date, in accordance with the submitted affidavit.

b) The ICHINO et al. device does not provide a heatsink carrier which supports an optoelectronic die. One function of the heatsink carrier is to remove heat from the optoelectronic

die. ICHINO et al. teach no need for such a heat-dissipating device for the optoelectronics. ICHINO et al. state, in column 4, lines 59 through 64: "deformation of the retiming circuit IC18 and the like due to heat has no influence on the main amplification circuit ceramic board 16 and the photo detector circuit ceramic board 8."; and again in column 8, lines 5 through 8, ICHINO et al. state: "this module is designed to prevent optical axis misalignment due to thermal deformation...." Owing to the fact that ICHINO et al. eschew the use of heat dissipation for the optoelectronics, it would not be obvious to add a heat sink as suggested by the rejection.

c) Applicants do not construct their device using bump bonding, as taught by ICHINO et al.

d) ICHINO et al. do not use a molded subassembly as claimed by Applicants.

e) ICHINO et al. do not show a removable optical coupling, as recited in Applicants' independent claims: 1, 5, 7, etc. ICHINO et al. state in column 7, lines 21 through 26: "the photodetector circuit ceramic board 8 of the

not agree Ichino et al

photodetector circuit unit is soldered to the main amplification circuit."

f) ICHINO et al. do not use a "flexible circuit", but rather flexible "wiring". Note that the IC18 is wire-bonded to the retiming circuit ceramic board 17 and the amplification circuit ceramic board 16 (column 7, lines 63 through 65). Please note wires 19 in column 4, line 24, and FIGURE 1.

g) ICHINO et al. do not show a coupling device for coupling a multiple channel fiber optic cable to a multiple channel Vertical Cavity Surface Emitting Laser (VCSEL) transmitter and a multiple channel Perpendicularly Aligned Integrated Die (PAID) receiver as now recited in new claims 31 and 32.

h) HENNINGSSON et al. do not teach a Faraday shield that is integrally molded as part of the subassembly.

In view of the foregoing amendments and remarks, Applicants respectfully request that claims 1 through 14 and 27 through 32 be allowed and that the application be passed to issue.

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11/6/01 (Date)

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31. A coupling device for coupling a multiple channel fiber optic cable to a multiple channel Vertical Cavity Surface Emitting Laser (VCSEL) transmitter and a multiple channel Perpendicularly Aligned Integrated Die (PAID) receiver, comprising: a flexible circuit disposed between at least one translating die operatively connected to a laminate, and an optoelectronic die; at least one heatsink carrier; a fiber optic cable connected to said at least one translating die such that said fiber optic cable exits from said laminate in a direction substantially parallel to a horizontal plane defining an orientation of said laminate; an overmold frame that is supported by said laminate, said overmold frame having a cavity for receiving said flexible circuit, said optoelectronic die and said at least one heatsink carrier; said at least one heatsink carrier being operatively connected to said optoelectronic die; said cavity of said overmold frame enclosing and securing said at least one heatsink carrier, said optoelectronic die and said flexible circuit.

32. The coupling device in accordance with claim 31, further comprising: at least one Faraday barrier shield, said overmold frame housing said at least one Faraday barrier shield providing RF isolation of said at least one optoelectronic die.